

Notes about water

ALL DRINKING WATER, including bottled water, might reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. Immunocompromised individuals – such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, those with HIV-AIDS or other immune system disorders, and some elderly and infants – can be particularly at risk of infections. These people should seek advice about drinking water from their health care providers. For more information about contaminants and potential health effects, or to receive a copy of the U.S. Environmental Protection Agency and the U.S. Centers for Disease Control guidelines on appropriate means to lessen the risk of infection by *cryptosporidium* and microbiological contaminants, call the EPA *Safe Drinking Water Hotline* at 1-800-426-4791.

SOURCES OF DRINKING WATER – both tap and bottled water – include rivers, lakes, streams, ponds, reservoirs, springs and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material and can pick up substances resulting from the presence of animals or from human activity. Contaminants that might be present in source water include:

MICROBIAL CONTAMINANTS, such as viruses and bacteria that may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife.

INORGANIC CONTAMINANTS, such as salts and metals, which can be naturally occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.

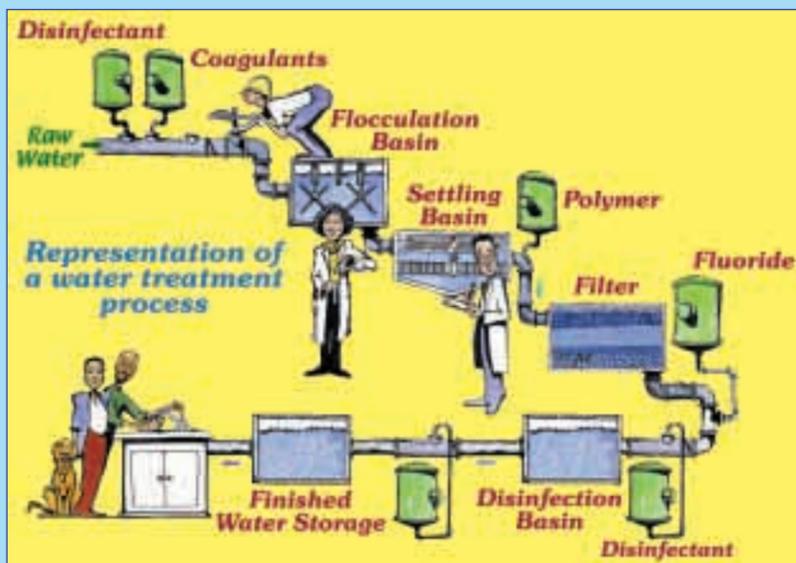
PESTICIDES AND HERBICIDES that may come from a variety of sources, such as agriculture, urban storm water runoff and residential uses.

ORGANIC CHEMICAL CONTAMINANTS, including synthetic and volatile organic chemicals, which are byproducts of industrial processes and petroleum production, and also may come from gas stations, urban storm water runoff and septic systems.

RADIOACTIVE CONTAMINANTS, which can be naturally occurring or be the result of oil and gas production and mining activities.

1... The treatment process consists of five steps – coagulation, sedimentation, filtration, corrosion control and disinfection. First, raw water from terminal reservoirs is drawn into mixing basins at our treatment plants, where we add alum and polymer. ...

2... That causes small particles to adhere to one another, making them heavy enough to settle into a basin from which sediment is removed. The water is then filtered through layers of fine, granulated material, either sand, coal or both, depending on the treatment plant. ...



4... Denver Water carefully monitors the amount of disinfectant added to maintain quality of water at the farthest reaches of the system. Fluoride occurs naturally but is also added to treated water, and pH is maintained by adding sodium hydroxide to reduce corrosion in the distribution system and your home or business.

3... As smaller, suspended particles are removed, turbidity diminishes and clear water emerges. Finally, as protection against any bacteria and viruses that might remain, a chlorine-based disinfectant is added before the water flows to underground reservoirs throughout the metro distribution system and into your home or business. ...

The Glossary

Some of the terms, abbreviations and symbols contained in this report are unique to the water industry and might not be familiar to all customers. In addition to explanations included in the footnotes to our Water Quality Roundup and other features on the other side, below are definitions to some other key terms:

CONTAMINANT: A potentially harmful physical, biological, chemical or radiological substance.

MAXIMUM CONTAMINANT LEVEL (MCL): Highest level of a contaminant allowed in drinking water. MCLs are set as close to the Maximum Contaminant Level Goal as feasible using the best available treatment technology.

Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

PARTS PER MILLION (PPM): Equivalent to milligrams per liter. One ppm is comparable to one drop of water in 55 gallons.

PARTS PER BILLION (PPB): Equivalent to micrograms per liter. One ppb is equivalent to one drop of water in 55,000 gallons.

PICOCURIES PER LITER (pCi/L) AND 4MREM/YR: Measures of radioactivity. (See below.)

4MREM/YR: Four milliroentgen equivalent man/year. A maximum contaminant level standard based on dosage; about 50 picocuries per liter.

SECONDARY MAXIMUM CONTAMINANT LEVEL (SMCL): Non-enforceable, recommended limits for substances that affect the taste, odor, color or other aesthetic qualities of drinking water, rather than posing a health risk.

Maximum Residual Disinfectant Level (MRDL): Highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Maximum Residual Disinfectant Level Goal (MRDLG): Level of a drinking water disinfectant below which there is no known or expected health risk. MRDLGs do not reflect benefits of the use of disinfectants to control microbial contaminants.

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THE INSIDE SCOOP!

Matching quality with quantity

Testing water every step of the way – from the mountains to your tap

Denver Water's record of water quality remains unblemished

Exceeding standards is the norm

Esta información es importante. Si no la pueden leer, necesitan que alguien se la pueda traducir. Información en español, llame al 303-893-2444.

DENVER WATER

2006

Water Quality REPORT

Denver Water vigilantly safeguards its mountain water supplies, and before the water reaches your tap, we carefully filter and treat it. This brochure, compiled from data collected throughout 2005, is a look at how Denver Water continues to provide you with a safe, dependable water supply. Visit us online at www.denverwater.org



DENVER WATER

Crypto & Giardia: The search goes on

Denver Water has tested for *Giardia* in both raw and treated water since the 1980s, and *Cryptosporidium* since the mid-1990s, and has never detected a viable indication of either in drinking water.

Crypto and Giardia are microscopic organisms that, when ingested, can result in diarrhea, cramps, fever and other gastro-intestinal symptoms. Crypto and Giardia must be ingested to cause disease, and they can be spread through means other than drinking water.

Most people readily recover from the organisms, which can cause more serious illness in people with compromised immune systems. The organisms are in many of Colorado's rivers and streams and come from animal wastes in the watershed. Crypto and Giardia are removed by effective filtration at the treatment plant. Disinfectants also kill Giardia.

New techniques save time, money, water

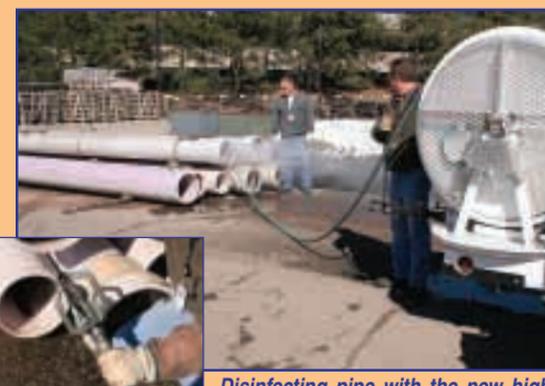
Denver Water has adapted two advanced disinfection procedures that are extremely effective in saving water, time and money when cleaning water mains. New and rehabilitated pipes are now treated with either high-pressure disinfection or an ozonation process.

Every water main put into the ground must be disinfected and flushed to ensure that it isn't contaminated with bacteria. For many years, these pipes were put back

into service after a high-strength solution was left to stand for a day before being neutralized and flushed with potable water. While all tests eventually topped health standards, about 25 percent didn't pass the first time around, so disinfection was continued to make sure that they did. The process was effective, but resources spent were drawbacks.

The new pressure-washing method also coats the inside of pipe with high-strength disinfectant injected by a hose inserted into the main. In addition, impediments that might harbor bacteria are scoured from the surface, which then is flushed with fresh water. The procedure, including sampling, averages about 30 minutes and uses much less water to accomplish a better result. After performing some 30 jobs over the last year, pressure washing has been 100 percent effective.

Ozone also is highly effective in destroying bacteria and is commonly used as an alternative to chlorine-based processes at treatment plants. Ozone is a reactive gas produced from oxygen. It mixes readily with water and can be easily pumped into a main. When disinfecting mains, pressurized oxygen cylinders in Denver Water's mobile ozonation unit generate ozone that is added to water from fire hydrants and injected into mains. The process is completely effective, takes minutes, and the ozone converts back into oxygen in one to two hours.



Disinfecting pipe with the new high-pressure nozzle shown in inset photo.

DENVER WATER'S TREATED WATER QUALITY ROUNDUP

REGULATED AT THE TREATMENT PLANT

Substance	Violation	Sampling Period	MCLG*	MCL*	Denver's Average	Range of Values	Sources of Substances	Footnotes
<i>Metals</i> Aluminum in parts per billion (ppb)	No	Monthly	n/a ¹	50 - 200 (SMCL) ²	45	n/d ³ - 93	Erosion of natural deposits; discharge of drilling wastes, coagulant	*MCLG and MCL: Maximum Contaminant Level Goal and Maximum Contaminant Level. ¹ Not applicable. ² Secondary Maximum Contaminant Level, which is not enforceable. ³ Non-detect: Laboratory analysis indicates that the constituent was not present. ⁴ PicoCuries per liter. ⁵ Equivalent dose. EPA considers 50 pCi/L to be the level of concern for beta particles. Fifteen (15) is the trigger level. ⁶ Two (2) is the Secondary Maximum Contaminant Level, which is not enforceable. Exceeding the Fluoride Secondary Maximum Contaminant Level of two milligrams per liter triggers public notification. ⁷ Treatment Technique: a required process intended to reduce the level of a contaminant in drinking water. ⁸ Turbidity has no known health effects. However, turbidity can interfere with disinfection and provide a medium for microbial growth.
Barium in parts per million (ppm)	No	Monthly	2	2	0.040	0.016 - 0.044	Erosion of natural deposits; discharge of drilling wastes	
Manganese in ppb	No	Monthly	n/a	50 (SMCL)	40	n/d - 60	Erosion of natural deposits; discharge of drilling wastes	
<i>Radiological</i> Beta/photon emitters in pCi/L ⁴	No	Quarterly	0	4mrem/yr ⁵ Equivil. dose 50	4	n/d - 9	Decay of natural deposits	
Gross Alpha in pCi/L	No	Quarterly	0	15	3	n/d - 6	Decay of natural deposits	
Uranium in ppb	No	Quarterly	0	30	n/d	n/d - 1.1	Erosion of natural deposits	
<i>Inorganics</i> Fluoride in ppm	No	6 times daily	4	(2 is SMCL) ⁶ 4	0.90	0.13 - 1.20	Erosion of natural deposits; water additive that promotes strong teeth	
Nitrate in ppm	No	Monthly	10	10	0.26	0.05 - 0.36	Erosion of natural deposits; leaching from septic tanks, sewage	
Total Dissolved Solids in ppm	No	Monthly	n/a	500 (SMCL)	167	50 - 189	Erosion of natural deposits	
Sodium in ppm	No	Monthly	n/a	n/a	21.0	3 - 23	Naturally present in the environment	
Sulfate in ppm	No	Monthly	n/a	250 (SMCL)	58.7	7.8 - 67.2	Naturally present in the environment	
<i>Organics</i> Total Organic Carbon as removal ratio	No	Running Annual Average	n/a	TT ⁷	Lowest running annual removal ratio 1.03 1.31 1.16	0.98 - 1.18 1.07 - 1.55 1.10 - 1.63	Naturally present in the environment Foothills Treatment Plant Moffat Treatment Plant Marston Treatment Plant	
Turbidity ⁸ in Nephelometric Turbidity Units	No	Continuous monitoring	n/a	TT	Highest Level in 2005 0.21	Monthly samples less than 0.3 NTU 100%	Soil runoff	

Numbers tell the story

Last year, the Water Quality Lab at Denver Water gathered 12,965 samples of raw and treated water and conducted 10,294 microbiological and 34,245 chemical tests.

Información en español

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Colorado Public Water System
I.D. No. 116001

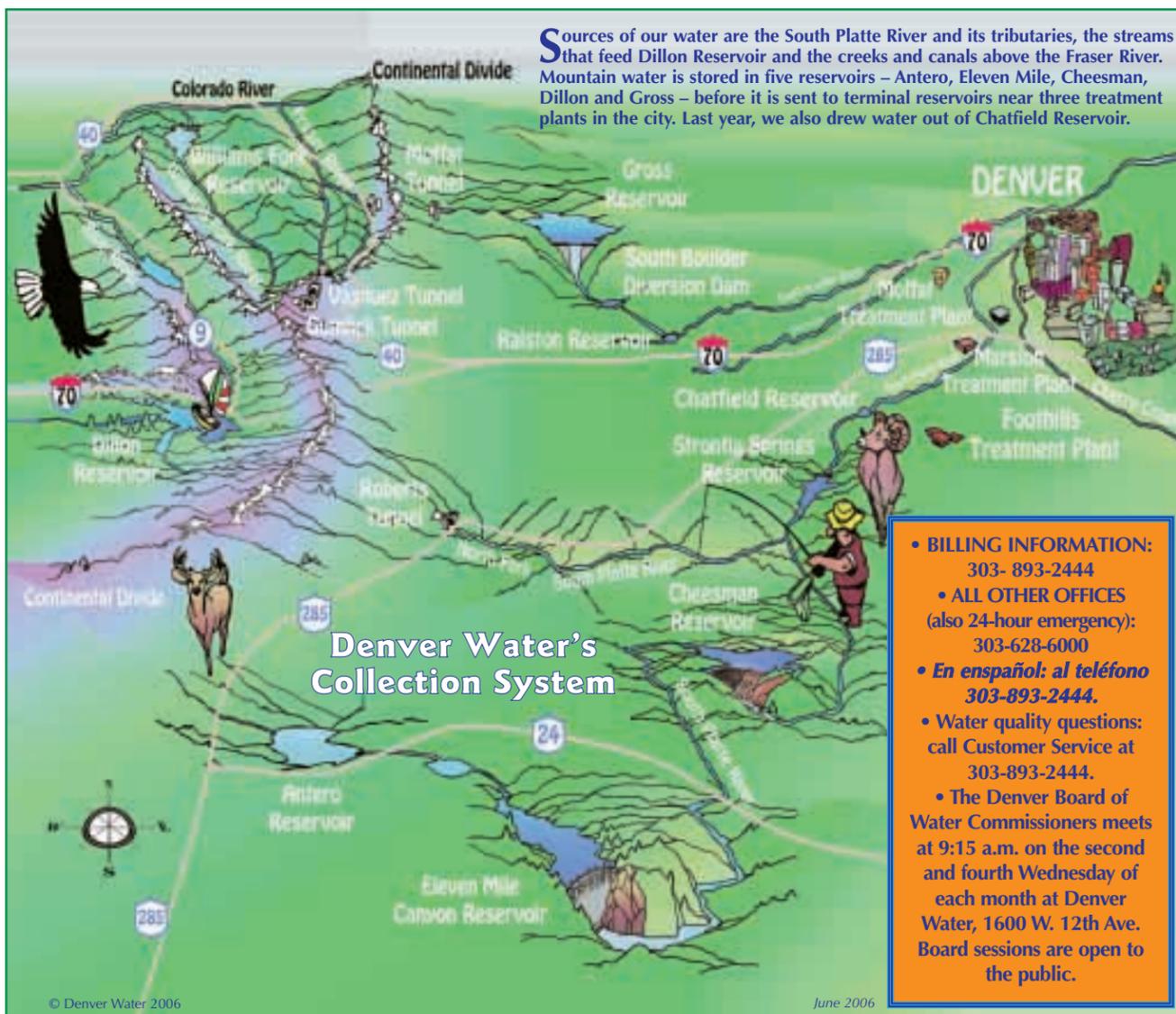
REGULATED IN THE DISTRIBUTION SYSTEM

Substance	Violation	Sampling Period	MCLG	MCL	90th Percentile Value	No. of Samples Exceeding AL	Sources of Substances	Footnotes
<i>Organic Disinfection By-Products (DBPs)</i> Total Trihalomethanes ¹ (TTHM) in ppb	No	Monthly	n/a	80	Highest RAA* 35	9 - 71	By-product of drinking water disinfection	*Running Annual Average. ¹ Total Trihalomethanes: By-products of the disinfection process. ² Less than 5% positive in any month. ³ Maximum Residual Disinfectant Level (MRDL): Highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
Haloacetic acids (HAA ₅) in ppb	No	Monthly	n/a	60	23 (RAA)	8 - 50	By-product of drinking water disinfection	
<i>Microbiological</i> Total Coliform as Absent or Present	No	Daily	0	5% mo. ²	Highest monthly percentage 0.56% July '05	4 positive detects out of 5,298 samples, or 0.08%	Naturally present in the environment	
<i>Disinfectant</i> Chloramine as Cl ₂ in ppm	No	Continuous monitoring	4	MRDL as Cl ₂ ³ 4	1.21	0.05 - 2.01	Drinking water disinfectant used to kill microbes	

REGULATED AT THE CUSTOMER'S TAP¹

Substance	Violation	Sampling Period	MCLG	Action Level ²	90th Percentile Value	No. of Samples Exceeding AL	Sources of Substances	Footnotes
<i>Inorganics</i> Lead in ppb	No	June - Sept. 2005 Triennially	0	At the 90th Percentile 15	9	2 out of 54	Corrosion of household plumbing	¹ Lead isn't found in Denver's treated water. However, it might be present in a home's or business's plumbing. Because Denver Water has consistently been below lead and copper Action Levels, the state health department permits reduced monitoring to once every three years. The next sampling for lead and copper will in 2008. Figures in this report are from 2005.
Copper in ppm	No	Triennially	1.3	1.3	0.34	0 out of 54		

² Action Level: Concentration of a contaminant that, if exceeded, triggers treatment or other requirements that a water system must follow.



MOUNTAIN WATER SOURCES

Denver's drinking water comes from rivers, lakes, streams, reservoirs and springs fed by high-quality mountain snow runoff. Supplies are entirely from surface sources in a watershed covering 3,100 square miles on both sides of the Continental Divide. The farthest reaches are more than 105 miles away, and the water is diverted and delivered by gravity through a complex system of streams, canals and pipes to treatment plants in the city. Prior to treatment, water flows into three terminal reservoirs with limited access to further ensure quality of the water. After treatment, drinking water is fed by both gravity and pumps to a system of underground, clear-water reservoirs and then to your home or business. Some 2,700 miles of pipe carry water to Denver Water customers.

ASSESSMENT IN THE WORKS

The state health department is in the final stages of completing an assessment of the potential for contaminants reaching any of the department's three terminal reservoirs at Strontia Springs, Marston and Ralston. (See map.) The report evaluates the possible contamination that could occur and doesn't imply that contamination has or will occur.

The water department will use this information to evaluate the need to improve its system and to prepare for future contamination threats. Also, the report is intended as a starting point for developing a broad source-water protection plan within the watershed.

These reservoirs might be susceptible to drainage from mines, leaking storage tanks, sediment from fire-damaged soils and other contaminants.